

for forest surveys. The standard scale was fixed at 4 inches to the mile, and all forests surveyed were surveyed on that scale.

21. Work was continued in the Northern Division of Kánara, and 132.75 square miles are reported by Colonel Pullan to have been completed.

22. The expenditure for the year was Rs. 25,200, so that the cost of the completed detail-survey, together with the advance-work accomplished, came to Rs. 190 per square mile. During the previous year, the cost came to Rs. 250. The past year's results are, therefore, so far favourable that the cost per square mile was considerably less than that of the previous year, but the rate is still very high and represents about two years' average net revenue.

23. The survey was carried out on the same system as that adopted during the previous year.

II.—WORKING PLANS.

24. Messrs. Bell and Oliver, Assistant Conservators, continued the enumeration of the forests which it is proposed to tap by means of a railway or tramway.

25. Mr. Bell measured the diameters of all trees over 6 inches in diameter on 2,268 acres, and Mr. Oliver those on 3,554 acres. These test-plots represent an area of 117,414 acres of forest.

26. The comparative smallness of the area examined by Mr. Bell may be attributable to the greater difficulty of the ground.

27. The justification of the proposed railway rests mainly on the quantity of teak annually exploitable. The quantity of other wood is very considerable, and much greater than the amount required for the proposed railway scheme.

28. The calculations have not yet been completed, but it appears probable that a yield of 2,300 teak-trees, over 24 inches in diameter, estimated to contain 3,900 tons of 50 cubic feet per ton, could safely be exploited annually from the forests east of the Gund-group, which is very difficult to get at. These 200,000 cubic feet of teak represent a much larger annual yield than has ever yet been exploited from the forests of the Northern Division of Kánara, and it would probably be difficult to get transport to carry out the work in the ordinary way by means of bullocks and carts. About 120,000 cubic feet is the usual quantity of teak exploited, and even this quantity is exploited with difficulty because only a certain class of men can be induced to undertake the work in the heart of the forests. A rail or tramway, will, therefore be necessary if a yield of 200,000 cubic feet is to be extracted.

29. Mr. Bell was assisted by Mr. Sātáráwála, Acting Sub-Assistant-Conservator, until the middle of December, when the latter fell seriously ill and did not return during the rest of the working-season. His place was taken by Mr. Sheshu Manju, Sub-Assistant Conservator.

30. Mr. Oliver was assisted by Mr. Haripad Mitra, who, however, soon left on account of illness, and did not return during the working-season.

CHAPTER III.

PROTECTION AND IMPROVEMENTS.

ESTABLISHMENT.

31. No change was made in the existing permanent staff, which was as usual supplemented by a temporary establishment. Proposals for a re-organization of the superior and subordinate staff were sent in on 25th June and 7th August 1888 as ordered by Government.

BREACHES OF THE LAW.

32. The number of prosecutions disposed of by Magistrates is as follows:—

No.	Divisions.	1887-88.			1888-89.			PERCENTAGE OF FAILURES.	
		Cases in which conviction was obtained.	Cases in which conviction failed.	Total.	Cases in which conviction was obtained.	Cases in which conviction failed.	Total.	1887-88.	1888-89.
1	Northern Division of Kánara	13	5	18	11	2	13	28	15
2	Central Division of Kánara	9	1	10	5	3	8	10	37
3	Southern Division of Kánara	11	6	17	9	9	18	35	50
4	Belgaum	7	6	13	11	1	12	46	8
5	Dhárwár	7	2	9	5	1	6	22	16
6	Kolába	22	8	30	45	9	54	26	17
7	Bijápur	1	3	4	8	3	11	75	27
8	Ratnágiri	5	2	7	4	3	7	28	42
	Total ...	75	33	108	98	31	129	31	24

33. The number of cases for the Circle shows an increase of 21, while the percentage of failure decreased from 31 to 24. The increase in the number of cases occurs almost entirely in Kolába where there were 15 cases of illegal *dáhi* cultivation and of thefts of wood from the forest reserves adjoining *dhára*-lands. The Divisional Officer complains that fellings in *dhára*-lands are used as a cloak for raiding in Government jungles, and that, until the rules under Section 41 of the Forest Act are amended, thefts of this nature will be very difficult to prevent.

34. But there is also reason to suspect that the forest subordinates connive at illicit practices and one range-forester's conduct was so unsatisfactory that he had to be degraded and transferred to Kánara, while another had to be transferred to another division.

35. The Kolába Division, owing to the peculiarities and varied forms of tenure existing there, is certainly the most difficult to protect of all the divisions of the Southern Circle; at the same time it is also by far the most strongly manned. Yet, in spite of the great number of guards, protection appears to be worse there than in any other part of the district, and I think this fact goes far to prove the argument that the great desideratum is not so much an increase in the number of guards as an improvement in the quality, and an increase in the number of superior officers who supervise them.

36. A case in Belgaum deserves special notice, in which 2 patels and 3 forest-guards were sentenced to imprisonment for terms varying from six months to one year, for having taken bribes in the execution of their duty in connection with the collection of grazing fees.

37. The following cases were compounded:—

No.	Division.	1887-88.		1888-89.	
		Number of cases commuted.	Amount of fines recovered.	Number of cases commuted.	Amount of fines recovered.
			Rs. a. p.		Rs. a. p.
1	Northern Division of Kánara	22	55 14 10	20	37 9 2
2	Central Division of Kánara ...	1	2 0 0	9	92 9 7
3	Southern Division of Kánara	32	342 0 0	109	401 0 0
4	Belgaum	37	114 9 10	62	307 12 11
5	Dhárwár	55	103 8 4	60	148 12 11
6	Kolába	140	515 0 7	194	855 2 3
7	Bijápur	310	231 6 6	89	174 15 3
8	Ratnágiri	55	97 13 10	56	252 11 3
	Total ...	652	1,462 5 11	599	2,270 9 4

38. A far greater number of cases was compounded in Belgaum and the Southern Division of Kánara than during the previous year, and this was, apparently, partly due to the new system of offering rewards to informers (under Government Resolution No. 8568, dated 16th December 1887), and partly to increased activity on the part of the forest officials. Kolába also shows an increase, where many cases of illegal *dáhli* cultivation are reported to have been compounded. The great decrease in Bijápur is not ascribable to any particular cause.

39. A statement showing the number of cases compounded or taken into Court, required by Government Resolution No. 3527 of 2nd May 1884, is given below :—

No.	Divisions.	Taken into Court.		Compromised under Section 67.		Total number of cases.	
		1887-88.	1888-89.	1887-88.	1888-89.	1887-88.	1888-89.
1	Northern Division of Kánara	18	16	22	20	40	36
2	Central Division of Kánara	10	13	1	9	11	22
3	Southern Division of Kánara	17	55	32	109	49	164
4	Belgaum	13	13	37	62	50	75
5	Dhárwár	9	6	55	60	64	66
6	Kolába	35	58	140	194	175	252
7	Bijápur	5	14	310	89	315	103
8	Ratnágiri	7	7	55	56	62	63
	Total ...	114	182	652	599	766	781

40. Of the 182 cases taken into Court, 53 were pending at the close of the year.

FOREST FIRES

41. Were as prevalent as ever. Nearly all were no doubt caused by incendiaries, and, in two or three instances, offenders were detected in the act and punished.

42. The area, for the fire-protection of which special measures were adopted in the three Kánara divisions, and those of Belgaum, Dhárwár and Kolába, amounted to 997 square miles; and 812 square miles 121 acres are reported to have been successfully protected at a cost of Rs. 3,490; the cost per acre of jungle attempted to be protected comes to 1.04 pies; but if the area reported to have been successfully protected alone be considered, the cost comes to 1.2 pies per acre.

43. The following facts no doubt militated against good results :—

(1) The unfavourableness of the season owing to the late setting-in of the summer-rains.

(2) The up-set of the original plans of operation at the last moment, owing to reduction by Government of the proposed expenditure.

(3) Enclosing too large an area by one fire-line in many cases.

44. The reported details of fire-protection are given in Form No. 51. It is impossible to place implicit reliance on these figures. From what I saw I would certainly say that the greater part of the specially-protected area was burnt, but the return shows that only 91,007 acres out of a total of 281,709 were burnt in the Northern Division. The correctness of the returns for the Central Division is still more doubtful, as fires were very prevalent there this year and frequently got into the specially-protected area.

45. That the greatest kindness and consideration on the part of Government—the granting to the rayat of the privilege to help himself to every thing he can possibly need in the form of forest produce—will not effect anything, is quite clear from the behaviour of the people in Kánara.* In spite of repeated entreaties, on the part of Government-officers, during the last twenty years, incendiarism is as prevalent in Kánara as in any part of the Circle in which privileges are confined to the collecting of dry firewood for domestic use.

46. That something can be done without the villagers remaining passive, I do not deny. We may be able to protect small areas at great expense, but nine-tenths of the deciduous forest will always be burnt, and its very existence as timber-forest endangered, by a handful of ungrateful and selfish men. If incendiaries could be easily detected, it would be a different matter, but it is easier to find a needle in a haystack than to detect an incendiary in the compact forest areas of Dhárwár, Belgaum and Kánara.

47. To remove the plague, very drastic measures need not perhaps be resorted to, but the immediate self-interest of the villagers must be brought into play. To tell the rustic—or, for that matter, the better-educated classes—that, unless he desists from firing the jungles, a hundred years or more hence his descendants may be deprived, as a natural consequence of his action, of many advantages he now derives from the forests, has no meaning for him whatever, the contingency is far too remote for his serious consideration.

48. Government have accepted the principle here enunciated and directed** that where fires are due to the co-operation, connivance, or gross negligence of the villagers, free grazing should be stopped for one year if one-third of the area has been burnt. But the application of this rule would be ineffectual throughout the forests of the Southern Marátha Country, because, practically, there is no free grazing. In forests, in which the fee *must* be paid for an animal, if it is to be grazed at all, because only that payment will open to it the grazing in an area sufficient for its wants, the closing of a comparatively-insignificant area (utterly insufficient to meet the grazing-requirements of the cattle of the village to which it belongs) is no penalty on the owner. In Kolába, and in some parts of the Northern Circle, grazing has hitherto been *free*, and, in such cases, the application of the rule would be a real punishment and equivalent to the one, which, in the 39th paragraph of my last administration-report, I submitted for the consideration of Government with a view to its being applied to the forests of the Southern Marátha Country.

49. The extreme importance, even from a purely financial point of view, of protecting the forests from fire is forcibly demonstrated by a comparison of the growth of teak in areas which have been continuously protected with that of teak growing in any unprotected part of Kánara. Compare, for instance, the growth of teak in the fire-protected plantation of Birchi and the neighbouring

* *Produce which may be taken without permission free of charge.*

- (1) Bámbus.
- (2) Junglewood for small-houses, huts, chappers, cattle-sheds, &c.
- (3) Dry-wood for fuel.
- (4) Reeds and grass for manure.
- (5) Thorns and brush-wood and stakes for hedges and dams.
- (6) Wood for agricultural implements, carts, sugar-cane-mills, grain-mills, &c. ; earth and stones.
- (7) The clearing away of all small brush-wood and thiek low-jungle within 50 feet of the boundaries of cultivated lands.

Produce which may be granted free on permission.

- (8) Dead sago and other palm-trees for water-courses, &c.
- (9) Large wood for repair of private houses.
- (10) Large wood for works of public utility, *e. g.* (1) village chaukis, (2) schools, (3) dharmshálas, (4) for covers, fencing, &c., to public wells, bridges over nálas and water-courses.
- (11) Bettá-lands free for ráb and firewood, at the rate of 4 to 8 acres of bettá for every acre of garden-land.

forest of Gobrál, which has not been specially-protected and which is frequently burnt:—

Name of Forest.	Average age of trees of the diameter shown in column 3.	Diameter at 4 feet from the ground.	Rate of diameter increment per annum.	Rate of cubic increment per cent. per annum.
1	2	3	4	5
	Years.	Inches.	Inches.	Feet.
Birchi ...	17	6.45	.35	8.35
Gobrál ...	42	8.00	.17	5.53

50. The inference that may be drawn from the comparison appears to be that fires reduce the diameter-growth to one-half of the normal. Consequently, that the yield of a forest continuously protected from fire would be double that of one not so protected: and that, instead of cutting 200,000 cubic feet of teak-timber annually in the Northern Division of Kánara—the present estimated sustained yield—we might with fire-protection cut 400,000 cubic feet. In reality we should get a great deal more, for a greater number of sound trees would reach maturity if the area were continuously protected from fire. But it does not appear to be at all probable that the forests can continue to yield even 200,000 cubic feet unless fires are kept out.

51. I have already alluded to the upsetting of the plans for fire-protection owing to the reduction of the proposed grant for that purpose. In some parts of the Circle, fire-paths had to be cleared in December, but the sanctioned budget-estimate was received on the 2nd January 1889, and I then learnt that the grant had been reduced from the proposed sum of Rs. 15,560 to Rs. 11,000. This necessitated my stopping all further fire-protection until I had learnt what works had been already carried out. A fresh allotment to divisions of the sanctioned sum had then to be made, and fresh schemes had to be prepared by the Divisional officers. But before all this could be accomplished, the fires were upon us.

52. The fact that last season was the first one in which fire-protection was attempted on a large scale, no doubt added to the difficulty of protection. The blocks attempted were generally too large for enclosure by one line and interior lines should have formed part of the plan.

53. The only areas that ordinarily escape fire without the adoption of special measures are evergreen forests. It is impossible to give the areas of these evergreens as they have not been measured off from the deciduous areas with which they are intermingled, and it is, therefore, impossible to give the information asked for by the Government of India in the 11th paragraph of their letter No. 816—F, dated 5th August 1889. They cover a comparatively small area and are to be found chiefly on the crest and western slopes of the gháts almost to the sea-board.

54. An attempt was made to eradicate by burning a species of *Strobilanthes* which has taken possession of large areas on the Belgaum gháts and which seeded during the year. The attempt was made, at the request of the Director of Agriculture, without much hope of its doing any good as the *bakra* has come up and spread in spite of annually-recurring fires. The villagers agreed to burn the plant, and clear it away from around harda-trees in order that they should not be damaged by the fire, and, therefore, the experiment was sanctioned. The result is not yet known.

GRAZING AND FENCING.

55. The revenue from grazing was Rs. 65,879, Rs. 4,352 more than during the previous year. The increase is mainly in the Belgaum Division where it (Rs. 3,911) is due to the energy of Mr. Murray and his subordinates, and to Mr. Fairlie-Muir, the Collector, who issued stringent orders to the kulkarnis and patels, who collect the revenue, not to delay the collection. In former

years, it has been the custom to allow cattle to continue to graze after the expiry of the permits, on the presumption that fresh permits would be taken out for them in due course. This rule led to great laxness in the collection of fees by the kulkarnis, enabled many graziers who bring their cattle to graze in the forests for a few months only of the dry season, to escape paying the fee altogether, and opened the door to fraud on the part of the kulkarnis and forest subordinates. Last cold weather, notice was, therefore, given that permits could be obtained beforehand for the ensuing season in the districts of Dhárwár, Belgaum and Kánara, but that no animal would be allowed to graze in the forests without a permit. The result has been a very large increase in Belgaum, and there will probably be an appreciable increase in Kánara and Dhárwar. Here are the figures:—

No.	Division.	1888-89, April to March.	1889-90, to 1st November.
		Rs.	Rs.
1	Belgaum	19,495	22,822
2	Dhárwár	16,289	14,814
3	Southern Division of Kánara ...	8,649	8,558
4	Central Division of Kánara ...	6,676	6,334
5	Northern Division of Kánara ...	6,837	6,351

56. These figures show the results for 1889-90 up to date only, whilst those for 1888-89 are for the whole year.

57. Grazing in Kolába and Ratnágiri has hitherto been free, and in Bijápur, the old system still exists of selling annually the right to pasturage in the forests. As soon as the proposed settlement of Bijápur receives the sanction of Government, the fee-system—which is the more acceptable mode of sale to the people, and the more profitable one to Government—will be introduced.

58. In Dhárwár, the forests of the Kod, Ránebennur, Bankápur and Karajgi-Sub-divisions, aggregating 37,445 acres, were closed to grazing; in Kolába 4,407 acres were closed; in Bijápur 5,235 acres of the Bágalkot and 8,305 acres of Bádámi forests were selected for closure; and in Belgaum 12,167 acres were closed to grazing.

NATURAL REPRODUCTION.

59. By-seed was bad, owing to the prevalence of fires.

60. Reproduction from stools in the firewood-coupes was good.

61. The only obstacles to natural reproduction by seed in the greater part of the forests of Kánara are fires and, in a less degree, grazing. The most valuable forests of that district are opening out, and it is only seedlings in ever-green-groups, and in others in which the predominant species is *jámbá* (*Inga xylocarpa*), that seedlings are able to make way from the first against fires.

62. The same remarks apply to the western parts of Belgaum and of Dhárwár.

63. Innumerable seedlings come up during the rains in situations less favourably situated for their survival, and are burnt down during the hot weather. In some cases, the roots survive, and then a fresh shoot is sent up at the beginning of the ensuing rains, which, in its turn, is burnt down in due course, and so on until the plant either succumbs or establishes itself after a fashion.

64. In Kolába and Ratnágiri, the jungles consist chiefly of coppice, the young shoots of which, although retarded in their growth and damaged by fires, are not easily killed outright.

65. In Bijápur, and in the eastern portions of Belgaum and Dhárwár, the forests consist mostly of scrub and small stuff up to 20 feet in height, the

rainfall is scanty, and the ground stony and covered with spear-grass. The conditions are, consequently, all unfavourable to natural regeneration by seed. Thorns and cactus are almost the only species that can propagate themselves in open ground by seed in the worst parts of the Circle ; but, where thorny cover is pretty dense, it has been found, in the talukas of Bádámi and Bágalkot of Bijápur, that tree-species which do not make much demand on the soil, and stand shade when young, such as *nim* and sandal, can be got to grow by simply sowing their seeds broad-cast amongst the bushes. Sheep and goats* are very numerous in all the eastern forests and are a great hindrance to natural reproduction, as they are only excluded from a portion of the forest-area. The very small fee of half-an-anna, which is charged for the right to pasture one of these animals for one year, encourages their increase within forest-limits, and I certainly think it would be a good plan to raise the fee to 4 annas if it is not thought expedient to exclude them altogether. They are bred chiefly for sale. A goat can now be fed for the market, entirely at Government-expense, for one year for half-an-anna, and it can then be sold for 12 annas or a rupee. For horned cattle, which do much less damage to the forest, 2 annas a head are paid.

ARTIFICIAL REGENERATION.

66. In the Northern Division of Kánara, 13,000 casuarina-seedlings were planted out on 11 acres of sandy waste. Of this number, a few died owing to drought, but the general state of the plantation, which is now 20 acres in extent, is good. A nursery containing 10,000 seedlings was made.

67. In the Central Division of Kánara, nurseries of teak, harda, matti and hone-seedlings were made near several watch-houses by the guards in charge : and about 2 cart-loads of seeds of various kinds were sown broad-cast under dying karvi (*Strobilanthes*), but, as the ground was subsequently traversed by fire, good results cannot be anticipated. In the Ankola-Sub-division, 2,858 teak, 1,000 casuarina, and 230 harda plants were put out. In the Kunta Sub-division, out of 1,275 casuarina, divi-divi and harda plants, planted in previous years on old *kumri*-lands, about 730 have survived.

68. In the Southern Division of Kánara, Bijápur and in Ratnágiri, a quantity of seeds was also sown broad-cast by forest-guards. In Ratnágiri, a nursery, containing 15,603 seedlings of various kinds, was made.

69. The experiment made last year at Jaknur in Bijápur to grow plants in the open without watering them was not a success. Of the 3,392 plants put out only 550 survived.

70. In Dhárwár, a few small areas were planted with anjan (*Hardwickia*), but the plants died from drought.

71. Altogether, a sum of Rs. 3,595 was expended on plantations during the year.

72. As a means of maintenance and improvement, importance is attached to the filling-up by guards of gaps caused by fellings in jardinaged forests. Old stumps of girdled trees do not throw out shoots when the trunks are cut down. But only superior species are girdled, and the drain on teak is so great that it must gradually disappear unless special means are adopted for favouring it in the struggle for existence. The most suitable men to employ for this purpose are evidently the guards, who should know where gaps have occurred, and can afford the time to attend to desultory work of this nature. The débris of branches of trees just felled affords good protection from animals, although somewhat increasing the risk of damage by fire, and I have ordered that, wherever a timber-tree in jardinage is cut out, two or three seedlings of teak, or other suitable tree of a superior kind, should be put down in the entanglement of branches which are not saleable. In the heavy timber-forests of Kánara seedlings from self-sown seeds can nearly always be obtained close to the sites of fellings, from spots in which they could not possibly all survive owing to their own density, the denseness of the cover over them, or other cause. In this manner, I think that an immense amount of useful work can be done by the guards without in any way interfering with their other duties.

* Since the close of the year, the grazing of goats in Bijápur forests has been prohibited.

73. So also in firewood, and worthless scrub-jungle much good can be effected by guards in planting or sowing inferior species in the more open parts and superior species in suitable places where the cover is denser. A beginning in this direction has been made by the officers in the Central Division of Kánara, and in Dhárwár, Bijápur and Ratnágiri. In future greater attention will, I hope, be paid to the subject in other divisions.

COMMUNICATIONS AND BUILDINGS.

74. The amount expended on "roads and bridges" was Rs. 1,973, on "buildings" Rs. 4,280 and on "other works" Rs. 486.

75. In the Northern Division of Kánara certain forest cart-tracks were repaired (Rs. 71-11-0); 2 new watch-houses were built (Rs. 600) and the range office at Supa was completed (Rs. 199).

76. In the Central Division of Kánara the Kánnigéri-Udámáki and Hittál-kárgadde-Mágód roads were repaired (Rs. 525) and two new watch-houses were built (Rs. 600).

77. In the Southern Division of Kánara the roads between Manchikéri and the Singanhalli Depôt, and between Kátur and Umachgi were repaired (Rs. 434). A new watch-house was built at Gersappa (Rs. 300), and a building for the Divisional Forest Office at Sirsi (Rs. 950).

78. In Belgaum, the Nágargáli-Halshi forest road was repaired (Rs. 915) and a new *náká*-house was built at Gokák (Rs. 188-12-0).

79. In Dhárwár, a *náká*-house was built at Kalkundi (Rs. 300), and the rest-house at Devikop was repaired (Rs. 200).

80. In Ratnágiri, the Bánd-road was put in repair as usual (Rs. 25-2-0).

81. It may perhaps appear to any one unacquainted with the district that communications are neglected in the Southern Circle. This is, however, not the case. With the exception of Kolába and Ratnágiri, where creeks and rivers take the place of roads to a very great extent, the whole of the forest area is extremely well provided with roads, for the repairs of which large quantities of wood are given free every year from the forests. Even the proposed line of railway to Pótóli will not open up forests hitherto unexplored, but will run for its whole length (21 miles) through forests which have been worked for many years by means of carts. If it is to open up forests to the market above ghát, it will have to be taken 15 or 20 miles further, across the Káneri-river to Gund.

82. The survey of a line for the proposed forest railway which is intended to tap the forests between Nágargáli, on the Southern Marátha Railway, and Gund, was carried as far as Pótóli. Pótóli is about 21 miles from its junction with the existing railway, and Gund about 40 miles. The rough estimate of the yield of the tract traversed by the proposed line will be submitted in a few weeks.

CHAPTER IV. YIELD AND WORKING.

83. The following shows the yield of the forests of the several divisions of the Southern Circle for the two years of 1887-88 and 1888-89 :—

Description of Produce.	1887-88.		1888-89.	
	Number.	Cubic feet.	Number.	Cubic feet.
Teak	256,596	...	250,576
Do. poles	10,788	...	23,028	...
Do. pieces for sleepers	46,164	...	17,319	...
Do. adzed sleepers	2,009	...	90	...
Thinnings from teak trees	Stacks 13	...
Blackwood	7,999	...	18,246